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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/624,858

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EXAMINER

DOAN, DUC T

ART UNIT

PAPER NUMBER

2188

DATE MAILED: 08/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/624,858

Applicant(s)

BELOUSSOV ET AL.

Examiner

Duc T. Doan

Art Unit

2188

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 May 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

Claims 1-54 have been presented for examination in this application. In response to the last office action, the specification has been amended, claims 1,11,24,39 have been amended, As the result, claims 1-54 are now pending in this application.

Claims 1-54 are rejected.

All rejections and objections not explicitly repeated below are withdrawn.

Applicant's arguments filed 5/25/06 have been fully considered but they are not persuasive. Therefore, the rejections from the previous office action are respectfully maintained, with changes as needed to address the amendments.

Claim Objections

Claims 28,39,51-53 are objected to because of the following informalities:

As per claims 28, 51-53, the recitation "(new)" is improper, since the claim was previously presented.

As per claim 39, the recitation "...data in the storage device.." lacks antecedent basis.

All dependent claims are objected to as having the same deficiencies as the claims they depend from.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6, 11-20, 23-29, 35-47, 49-54 rejected under 35 U.S.C. 103(a) as being unpatentable over Clifton et al (US 6081875) and in view of Ohran et al (US 2002/0112134).

As in claim 1, Clifton discloses a computer system operable to provide backup copying of data without suspending an application program accessing the data (Clifton's column 3 lines 50-60, column 5 lines 50-67 discloses a technique of snapshot and keep track of data blocks being copied, such that host's accessing to these data blocks can occur in parallel with the copying activities), comprising: a storage device operable to store block data (Clifton's Fig 2: #130 storage), a backup device operable to store block backup data (Clifton's Fig 2: #140 backup appliance) and operable to restore the storage device multiple times and to any prior consistent state of the storage device stored as the block backup data; and an intermediate block data container operable to store backup block data (Clifton's Fig 2: #141 system memory's storage buffers), wherein the computer system is operable to copy a data block from the storage device into the intermediate block data container (Clifton's Fig 2; column 4 lines 30-35), and wherein the intermediate block data container is protected from data overwrite during the online backup process (Clifton's column 4 lines 30-43 discloses the data

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block being backup is saved in ODC #246, thus data is protected from data overwrite by subsequent host requests during the online backup process),

and wherein the computer system is operable to manage the online data backup process by:

compiling a list of data storage blocks located in the storage device that are subject to the data backup process, copying a data storage block to the backup storage device according to the list of data storage blocks (Clifton's column 5 lines 35-50 discloses the system maintains map of the specific addresses to be backup, and COW only makes a copy when write requests occurring for these data blocks); suspending a write command that is directed to a data storage block that is subject to the data backup process but has not yet been copied, copying the data storage block that is the subject of a write command to the intermediate storage device, executing the write command and copying the data storage block from the intermediate storage device to the backup storage device (see Clifton's Fig 2, column 4 lines 47-67, column 5 lines 40-50 discloses, initially suspending write command, then COW only copies the data blocks to be backup to ODC #246, thus allowing the write command to be executed concurrently with backup operation). Clifton does not disclose the claim's detail of restore the storage device multiple times and to any prior consistent state of the storage device stored as the block backup data. However, Ohran's paragraph 36 discloses a backup and restores method employing metadata structures including time stamp information for each data blocks being backed up. It would have been obvious to one of ordinary skill in the art at the time of invention to include the backup and restore method as taught by Ohran in Clifton's system. One skilled in the art would have been motivated to do so, because by unitizing the time stamps of backup data blocks, the data can be easily restored to any previous consistent states (see Ohran's paragraph 33, T0, T1, T2 times).

Clifton does not expressly disclose the limitations in claims 2-6, however, Ohran discloses as follows:

As in claims 2-6, the claims recite wherein the intermediate block data container is located in a memory location that is external to the computer file system (claim 2); wherein the intermediate block data container is located in the storage device (claim 3); wherein the intermediate block data container is a separate partition of the storage device (claim 4); wherein the intermediate block data container is a file within the file system (claim 5). Ohran's paragraph 29 discloses the preservation memory #14 (corresponds to the claim's intermediate block container) can be any devices including volatile memory (RAM) storage or non-volatile mass storage devices (disk), furthermore Clifton discloses data is stored in well known structures such as file, volumes and grouping to a partition (paragraphs 28,29).

As in claim 6, the claim recites wherein the file system is further operable to write dirty pages to the storage device before initiating a data backup process. Ohran's paragraph 41 describes the well known technique in the art, that is before backup operation, data is destaged to a mass storage device to establish a completed permanent data set at time T0.

Claim 11 rejected based on the same rationale as of claim 1. Clifton's column 3 lines 40-60 teaches when the backup process is initiated, the server #120, using its associated operating system driver, informs this backup data state to the application database application's processes, therefore it insures the data consistency state across all database application's processes.

Claims 12-13 rejected based on the same rationale as of claim 11. Clifton's column 5 lines 40-50 discloses data structures capable of tracking states of data blocks such as not being copied, will be copied, being copied, already copied, etc.

As in claim 14, the claim rejected based on the same rationale as of claim 12. Clifton's column 5 lines 20-30 further discloses when data blocked has been copied, the operation system's driver of server #102 is informed so that the write command from the server can be performed.

As in claim 15, the claim recites receiving a data block number associated with the listed data block upon receiving a write operation directed to a listed data block. Clifton's column 6 lines 30-45 discloses a backup method of data blocks based on comparing data blocks identified in a request with data blocks identified in a list of blocks being backup. The data block identifiers are well known in the art including volume, block numbers that identify those data blocks.

Claims 16 rejected based on the same rationale as of claim 6.

Claims 17 rejected based on the same rationale as of claim 2.

Claim 18 rejected based on the same rationale as of claim 4.

Claim 19 rejected based on the same rationale as of claim 5.

Claim 20 rejected based on the same rationale as of claim 6.

As in claim 23, the claim recites wherein a list of data blocks located in the storage device that are subject to the online data backup process includes all blocks of an underlying storage device used by file system data and does not include free space blocks. Clifton's column 5 lines 40-49 discloses a copy on write technique, COW, that copies only the data blocks intended for copying operations.

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Claim 24 rejected based on the same rationale as of claim 11.

Claim 25 rejected based on the same rationale as of claim 17.

Claim 26 rejected based on the same rationale as of claim 3.

Claim 27 rejected based on the same rationale as of claim 4.

Claim 28 rejected based on the same rationale as of claims 5.

Claim 29 rejected based on the same rationale as of claim 6.

Claim 35 rejected based on the same rationale as of claim 22.

Claim 36 rejected based on the same rationale as of claim 23.

As in claim 37, the claim recites wherein backed up data blocks are restored on the fly to a different storage device. The claim rejected based on the same rationale as of claim 1.

Furthermore, it's has been known in the art that a file system can be easily created, modified, mounted in any number of physical storage devices using file system accessing commands.

As in claim 38, the claim recites wherein an order in which data blocks are scheduled for backup is changed based on information received from an external source. Clifton discloses the data blocks to be transferred are scheduled in different order depending if the update write is to the full track write or not full track write, Clifton's column 9 lines 13-30

Claim 39 rejected based on the same rationale as of claim 11.

Claim 40 rejected based on the same rationale as of claim 12.

Claim 41 rejected based on the same rationale as of claim 13.

Claim 42 rejected based on the same rationale as of claim 14.

Claim 43 rejected based on the same rationale as of claim 15.

Claim 44 rejected based on the same rationale as of claim 6.

Claim 45 rejected based on the same rationale as of claims 2 and 12.

Claim 46 rejected based on the same rationale as of claim 4.

Claim 47 rejected based on the same rationale as of claim 5.

Claim 49 rejected based on the same rationale as of claim 22.

Claim 50 rejected based on the same rationale as of claim 23.

Claim 51 rejected based on the same rationale as of claim 11.

Claim 52 rejected based on the same rationale as of claim 37.

Claim 53 rejected based on the same rationale as of claim 38.

Claim 54 rejected based on the same rationale as of claim 11.

Claims 7,22,30,48 rejected under 35 U.S.C. 103(a) as being unpatentable over Clifton et al (US 6081875), Ohran et al (US 2002/0112134) as applied to claims 1,25,39 and in view of Watanabe et al (US 7013371).

As in claim 7, the claim recites suspend a write command to the storage device during the data backup process if the intermediate block data container has reached a selected data capacity, and copy a selected amount of data from the intermediate block data container to the backup storage device. Clifton does not expressly disclose the claim's detail of suspending a write command. However, Watanabe's column 4 lines 27-35 discloses a data copying method that monitors the write commands, when data container (Fig 1: #14a) reaches a capacity threshold, the write commands to the storage devices (write to Fig 1: #17b disks) will be suspended. It would have been obvious to one of ordinary skill in the art at the time of invention to include the data backup method as taught by Watanabe in Clifton's system to detect a data capacity

threshold, preventing the overflowing of data during the backup operation, and thereby further enhance the data integrity of the overall system (see Watanabe's column 4 lines 27-53).

As in claim 22, the claim recites upon receiving an indication that the intermediate block data container is close to overload, initiating a temporary slowdown of write operations by slowing down processes whose activity results in write operations into a non-backed-up area. The claim rejected based on the same rationale as of the rejection of claim 7. Wananabe's column 5 lines 15-30 clearly teach during the suspending period, data is maintained temporary in Fig 2: # 15a, 17a not being backed up.

Claims 30,48 rejected based on the same rationale as of claim 7.

Claims 21,8-10,31-34 rejected under 35 U.S.C. 103(a) as being unpatentable over Clifton et al (US 6081875), Ohran et al (US 2002/0112134) as applied to claims 21 and in view of Uemura et al (US 5720026).

As in claims 8-10, the claims recites wherein the file system driver translates a write request addressed to a file located in the storage device received from a user process into one or more block write operations (claim 8); wherein the file system driver transmits a write request received from an operating system process (claim 9); wherein the file system driver provides a data block number associated with a block in response to a write command directed to the data block during the online data backup process (claim 10). Clifton does not explicitly describe the claims' detail of the driver. However Uemura discloses a pseudo device driver operating under control of an operating system capable of interpreting the data blocks in the map table and sending these data blocks during the backup operation (Uemura's column 6 lines 10-35). It

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would have been obvious to one of ordinary skill in the art at the time of invention to include the pseudo device driver component as taught by Uemura in Clifton's system thereby allowing concurrent processing of application program accessing data and backup operation while maintaining the consistency of data in the disk (Uemura's column 5 lines 33-55).

As in claim 21 the claim recites a file system driver operable to transmit a write request to write to the storage device; and a storage device program operable to read from the storage device and write to the storage device in block mode in response to the write request. Uemura discloses the pseudo driver capable of function as in the block mode driver in column 6 lines 10-26. It would have been obvious to one of ordinary skill in the art at the time of invention to include the pseudo device driver component as taught by Uemura in Clifton's system thereby allowing concurrent processing of application program accessing data and backup operation while maintaining the consistency of data in the disk (Uemura's column 5 lines 33-55).

Claim 31 rejected based on the same rationale as of claim 21.

Claim 32 rejected based on the same rationale as of the rejection of claim 8.

Claim 33 rejected based on the same rationale as of the rejection of claim 9.

Claim 34 rejected based on the same rationale as of the rejection of claim 10.

Response to Arguments

Applicant's arguments in response to the last office action has been fully considered but they are not persuasive. Examiner respectfully traverses Applicant's arguments for the following reasons:

A) In the interview on 5/15/06, Applicant's representative argued that Ofek reference (Ofek et al 659813) is drawn to data migration whereas the instant application is drawn to data backup. As discussed in the interview, Examiner respectfully disagreed, Ofek discloses an online real time migration data method from a source storage device to a target storage device that is substantial similar to the instant application. The data migration method comprises all the steps that are required for backing up data from a source storage device to a target storage device. The on line data migration also provide an extra option that is after data is backed up, the data accessing can be directed to the target storage device so that the source storage device can temporary be off-line for maintenance or upgrading purpose. Once the upgrading on the source storage device is done, obviously the backed up data in the target storage device will be restored to the source storage device (see Ofek's column 1 lines 50-61).

Although Ofek uses the data migration, as an example for illustrating techniques to transfer data blocks from a source storage device to a target storage device, Ofek clearly teaches that the same techniques are applied for other operation such as backing up data (see Ofek's column 1,2).

B) Applicant appears to argue that Ofek does not teach backup data by copying source data image in a consistent state. Examiner respectfully disagrees. Ofek's Fig 2 shows data map/table using to track states of all data block/volumes in storage devices so that the storage system can back up data and providing data for host's accessing requests in a consistent manner.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

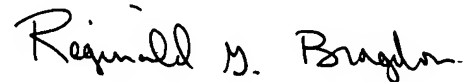
When responding to the office action, Applicant is advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist examiner to locate the appropriate paragraphs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Duc T. Doan whose telephone number is 571-272-4171. The examiner can normally be reached on M-F 8:00 AM 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 571-272-4210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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